	1		FREQU	JENCY		ب		NO.					MA	MUMIX						TYP	ICAL		
TYPE NUMBER	CODE	KIND	Min	Max	DUTY	-	MFR	OPERATION	Ef	If	Ε <sub>b</sub>	Ik	Po	REFLECTOR	Eg,	HELIX VOLTAGE	GAIN	NF	PULL	BAND	MAG FIELD	CAVITY	CALIDITAL
			$G_{C}$	$G_{C}$	104				V	ma	V	ma	mw	V	V	V	db	db		Mc	gauss		
QKW750A	S	TWA	2.9	3.1			RA	Р	7.5	8000	36K	13A	60K								1200		C
QK 752		KLO	7 • 1	7.8		MEC	RA	C	6.3	440	330	35	120	380						25		R1	CC
QKK <b>7</b> 52	S	KLO	7 • 1	7.8		MEC	RA	C	6.3	440	330	35	120	380						15		R1	CC
QK 753		KLO	7.8	8.4		MEC	RA	C	6.3	440	330	35	120	380						25		RI	CC
QKK753	S	KLO	7•7	8.4		MEC	RA	С	6.3	440	330	35	120	380						15		RI	CC
QK <b>7</b> 54		KLO	5.9	6.4		MEC	RA	С	6.3	675	1000	100	1800	500						36		RI	C
QKK <b>7</b> 55		KLO	6.6	6.9		MEC	RA	C	6.3	675	800	100	1500	600						35		R1	CC
QKK756		KLO	6.9	7 • 1		MEC	RA	C	6.3	675	800	100	1500	600						35		R1	CC
QK 758		KLO	7 • 1	7.8		MEC	RA	C	6.3	650	750		1300									R1	CC
QKK758	S	KLO	7 • I	7.8		MEC	RA	C	6.3	675	1000	100	1500	500						35		R1	C
QK <b>7</b> 59		KLO	7.8	7.8		MEC	RA	С	6.3	650	750		1300									R1	C
QKK 759	S	KLO	7.8	8.4		MEC	RA	C	6.3	675	1000	100	1500	500						35		R1	CC
QKB <b>7</b> 60A	#	BWO	4 • 0	8.0		$\vee$ T	RA	C	6.3	1000	150	45	20	1500	100			30			IΜ		CC
x768		KLA	0.8	1.0			EI	C			30K		75K							7		ЗE	WC
QKB <b>77</b> 6	#	BWO	8.0	12.4		$\vee$ T	RA	С	6.8	1800	150	45	20	1500	150			30			ΙM		WG
EM 778	#	TWA	5.0	11.0			E1	С	6.3	600	3000	30	2000		100		60	34			IΜ		CC
X778	#	TWA	5.0	11.0			ΕI	C	6.3	600	3000	30	1000		10		60						
QK <b>S7</b> 83A	S	AMA	2.7	2.9	50		RA	P			54K	66A	ЗМ								IM		WG
QKB786	#	BWO	1 • 0	2.0		VT	RA	C	6.3	1500	250	45	100	1500	200			30			IΜ		C
QK 790		MAG	8.9	9.4	10	MEC	RA	P	5.0	450	4500	1000	1 K								1 M		WC
QK 798		MAG	9 • 4	9.4	3	FX	RA	P	5.0	650	5000	3500	5K										CC
VA800	#	KLA	1 • 7	2.4		MEC	VA	C	1.5	12A	20K	2350	13K				56			8		4 I	WO
VA800C	#	KLA	2 • 1	2.4			VA	C			15K	1850	10K				40			8			
BL801		KLO	8.5	9.6		MEC	BL	C	6.3	450	350	52	20	500						30		R1	WC
BL802		KLO	8 • 8	9.2			ВL	С	6.3	1300	350	60	4	300								RE	
VA802B	#	KLA	1 • 7	2.4		MEC	VΑ	С	6.3	7500	7000	600	1 K							4	IΜ	1 N	CC
VA804		KLA	4 • 4	5.9			VA	C			9000	750	2K				45			8		4 I	
VA805		KLA	5.9	6.4			VΑ	C			9000	750	2K				45			10		4 I	
BL806		KLO	8.6	9.9			BL	C			500		15									R	
VA806A	#	KLA	8 • 4	8.5		FX	VA	С	10.0	2200	1 OK	800	2K				53					41	WG
VA806B		KLA	8 • 4	8.4		FX	VA	С	10.0	2200	10K	800	2K				53					41	WC
VA806C		KLA	8 • 4	8.4		FX	VA	C	10.0	2000	10K	900	1 K				51					4 I	WC
VA806D	#	KLA	8.3	8.4		FΧ	VA	C	10.0	2200	1 oK	800	2K				53					41	WC
VA806E	#	KLA	8.2	8.3		FX	VA	C	10.0	2200	10K	800	2K				53					4 I	WG
VA806F	#	KLA	8.2	8.2		FX	VA	C	10.0	2200	1 o K	800	2K				53					41	WC

NUMERICAL LISTING

## **Definitions**

Type Number. This column lists the numerical-alphabetical designation assigned by the manufacturer. The Numerical Listing on page 5 has been arranged according to the industry standard, i.e., primarily by arranging the initial numerical portion in sequence, secondarily by arranging the alphabetical prefix in sequence and finally by arranging the alphabetical suffix in order e.g.

PKX2 PA3 PKX3 PKX3A 3K2500LX 3K2500SG 3K3000LQ 3K20,000LA

Code. The letter "M" in this column, indicates that there are manufacturers other than the listed manufacturer or registrant who produce this tube. A list of these manufacturers will be found in the other manufacturers list on page 127.

The letter "S" in this column, indicates that this tube is similar to some other type. A tabulation of these types will be found in the Similar Tubes list on pages 117 through 126. These similar types are those stated by the manufacturers as being similar to, a frequency variant of, or a Prototype of a given tube.

The letter "X" in this column, indicates that

The letter "X" in this column, indicates that there are both similar types and other manu-

facturers of this type.

An asterisk (\*) is used to designate tube types found in the Military Preferred list issued by the Department of Defense as "Military Standard Electron Tubes and Semiconductor Devices, Diode" MIL-STD-200E (2 March 1960) and MIL-STD-200E (7 July 1960) (Navy Supplement 1B).

A number sign (#) designates a reliable or premium type as indicated by the manufacturer.

Kind. A three-letter code is used to describe the generic group of tubes. This is used as the primary sorting means for the Characteristic Listing.

AMA	Amplitron Amplifier or Platinotron
AMO	Amplitron Oscillator or Stabilotron
BWA	Backward Wave Amplifier
$_{\rm BWO}$	Backward Wave Oscillator
CAR	Carcinotron
$_{ m HEL}$	Helitron
KLA	Klystron Amplifier
$_{\rm KLM}$	Klystron Multiplier
$_{\rm KLO}$	Klystron Oscillator
MAG	Magnetron
TWA	Traveling Wave Amplifier
$_{\rm TWM}$	Traveling Wave Multiplier

Frequency. Both minimum and maximum frequency of operation are listed in gigacycles (10<sup>9</sup> cps) with the exception that the 'letterband' designation (i.e., S-band, X-band) is used when more specific information is unavailable. Fixed-tuned tubes are available at any frequency within the tabulated range. In the case of frequency multiplier tubes, output frequency is tabulated.

**Duty Cycle.** The duty cycle for pulsed operation is often specified as a percentage, although it may also appear as the product of the pulse-duration time (tp) and the pulse-repetition rate (prr). The tabulated value is the product of the pulse-duration time and the pulse-repetition rate times  $10^4$ . The following table illustrates both methods of specifying Duty Cycle and the

corresponding tabulated value.

Duty	cycle	Tabulated		
% 0. 05 .1 1. 0 10. 0 15. 0 20. 0	(tp) (prr) 0.0005 .001 .01 .1	Value 5 10 100 1 1K *1K (between 10% and 20%)		

**Tuning.** The method by which the tube is frequency-tuned is shown by the following alphabetical code.

FX	Fixed tuned
HY	Hydraulically tuned
MEC	Mechanically tuned
TH	Thermally tuned
VT	Voltage tuned

Manufacturer. The alphabetical code refers to either the company originally registering the tube type with the Electronic Industries Association or a probable manufacturer of the type. In case of foreign tubes produced by more than one manufacturer, this column is blank. The known manufacturers will be found in the listing of Other Manufacturers beginning on page 127.

AM	Amperex Electronic Corp.
BE	Bendix Aviation Corp.
$_{ m BL}$	Bomac Laboratories, Inc.
BT	Bell Telephone Laboratories, Inc.
CF	Compagnie Francaise Thomson-Houston
CS	Compagnie Generale de T.S.F.
$\mathbf{E}\mathbf{E}$	English Electric Valve Co.
EC	Microwave Electronics Corp.
EI	Eitel McCullough, Inc.
EM	E.M.I. Electronics Ltd.
FE	Ferranti Electric Co.
GC	General Electric Co., Ltd.
GE	General Electric Co.
GL	Geisler Laboratories
$_{\rm HI}$	Hitachi Ltd.

Hughes Products

HP

International Telephone & Telegraph IT KK Kobe Kogyo Litton Industries LI LR Lorenz Rohren MA Microwave Associates, Inc. MC Canadian Marconi Co. ME Microwave Electronic Tube Co., Inc. MU Mullard Ltd. NENippon Electric Co. PH Philips Laboratories PO Polarad Electronics Corp. RARaytheon Manufacturing Co. RC Radio Corporation of America RE Rogers Electronic Tubes & Components SE Stewart Engineering Co. SFSociete Francaise Radioelectrique SPSperry Electric Tube Division STStandard Telephones & Cables Ltd. SY Sylvania Electric Products, Inc. TE Telefunken G.M.B.H. TH British Thomson-Houston Co., Ltd. TO Tokyo-Shibaura (Toshiba) TU Tucor, Inc. VAVarian Associates WE Western Electric Co., Inc. WH Westinghouse Electric Corp. WJWatkins-Johnson Co.

Huggins Laboratories, Inc.

**Operation.** This is an alphabetical code to indicate the type or operation, as shown,

C Continuous Wave Operation

P Pulsed Operation (If a manufacturer has specified different operating parameters depending upon a tubes' operation either pulsed or CW, the tube is tabulated twice to include both sets of conditions.)

**Ef.** The nominal heater or filament voltage in volts.

If Th

HU

If. The nominal heater or filament current in

milliamperes.

Beam or Anode Volts. The maximum anode, beam or resonator voltage. All voltages and currents given in this and the following columns are maximum values (peak values in the case of pulsed tubes) as these will aid in determining the power supplies needed to operate the tube over its complete range.

Ik. The maximum cathode or plate current in

milliamperes.

**Po.** The maximum power output.

Collector Reflector, etc. Volts. The maximum collector, reflector line, etc. voltage whichever is most applicable.

Control Volts Eg1. The maximum control,

focusing or grid supply voltage.

Helix Voltage. The maximum helix or delay-

line voltage of traveling wave tubes.

Gain. The maximum, small-signal gain in decibels, or in the case of frequency multiplier tubes, the multiplication factor.

NF. The typical noise factor in decibels.

Pulling Factor. The pulling factor in megacycles per second. A pulling factor of less than one megacycle is indicated by \*1.

Bandwidth. The frequency difference between half-power points for amplifier tubes or the elec-

tronic tuning range for oscillator tubes.

Magnetic Field. Numerical figures indicate the magnetic field strength in gauss or the alphabetical code "IM" indicates an integral permanent magnet.

Cavity. The number and type of cavities characteristic of the tube is indicated by the code.

IN	Internal Cavity
EX	External Cavity
RE	Reflex, External Cavity
RI	Reflex, Internal Cavity
#I	Number of internal Cavities
#E	Number of external Cavities
R	Reflex

**Coupling.** The type of output coupling of the tube is coded as follows:

CO	Coaxial	
SP	Special	
WG	Waveguide	
WC	Waveguide or Coaxia	1

## 3.3. Unit Symbols

While the normally used electrical unit is printed at the top of each column, it will be noted that letter symbols are used following some numbers to indicate a change of unit.

Symbol	Heading	Unit
"A"	If	Amperes
"K"	Eb	Kilovolts
"A"	Ik	Amperes
"U"	Ik	Microamperes
"K"	Po	Kilowatts
"M"	Po	Megawatts
"U"	Po	Microwatts
"W"	Po	Watts
"K"	Collector Reflector Voltage	Kilovolts
"K"	Control Voltage	Kilovolts
"K"	Helix Voltage	Kilovolts
"K"	Bandwidth	Kilocycles